

CLAIMS

Sub E1 > 1. A process for production of an essential oil-rich hop extract, comprising the steps of:

5 (1) extracting hops with supercritical or subcritical carbon dioxide solvent at a pressure of 80 to 100 kg/cm<sup>2</sup> to obtain a carbon dioxide extract; and

(2) separating an essential oil-rich hop extract from the carbon dioxide extract.

10 2. A process for production of an essential oil-rich hop extract, comprising the steps of:

(1) extracting hops with supercritical or subcritical carbon dioxide solvent at an extraction pressure of higher than 100 kg/cm<sup>2</sup> to obtain a carbon dioxide extract;

15 (2) separating bitter components from the carbon dioxide extract at a pressure between 100 kg/cm<sup>2</sup> and said extraction pressure; and then

(3) separating an essential oil-rich hop extract from the carbon dioxide extract at a pressure of 20 lower than 100 kg/cm<sup>2</sup>.

3. An essential oil-rich hop extract obtainable by the steps of:

25 (1) extracting hops with supercritical or subcritical carbon dioxide solvent at a pressure of 80 to 100 kg/cm<sup>2</sup> to obtain a carbon dioxide extract; and

(2) separating an essential oil-rich hop extract from the carbon dioxide extract.

4. An essential oil-rich extract obtainable by the step of:

30 (1) extracting hops with supercritical or subcritical carbon dioxide solvent at an extraction pressure of higher than 100 kg/cm<sup>2</sup> to obtain a carbon dioxide extract;

35 (2) separating bitter components from the carbon dioxide extract at a pressure between 100 kg/cm<sup>2</sup> and said extraction pressure; and then

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Sub B1>  
(3) separating an essential oil-rich hop extract from the carbon dioxide extract at a pressure of lower than 100 kg/cm<sup>2</sup>.

5. A product comprising:

5 (A) an essential oil-rich hop extract obtainable by the steps of:

(1) extracting hops with supercritical or subcritical carbon dioxide solvent at a pressure of 80 to 100 kg/cm<sup>2</sup> to obtain a carbon dioxide extract and a hop extract residue; and

(2) separating an essential oil-rich hop extract from the carbon dioxide extract; and

(B) said hop extract residue.

6. A product comprising:

15 (A) an essential oil-rich hop extract obtainable by the steps of:

(1) extracting hops with supercritical or subcritical carbon dioxide solvent at an extraction pressure of higher than 100 kg/cm<sup>2</sup> to obtain a carbon dioxide extract and a hop extract residue;

(2) separating bitter components from the carbon dioxide extract at a pressure between 100 kg/cm<sup>2</sup> and said extraction pressure; and then

(3) separating an essential oil-rich hop extract from the carbon dioxide extract at a pressure of lower than 100 kg/cm<sup>2</sup>; and

(B) said hop extract residue.

7. A process for production of a highly aromatic wort comprising the steps of:

G 30 (1) adding a product according to claim 1 to a wort; and

(2) maintaining the wort containing the above-mentioned product at a temperature of at least 95°C for at least 10 minutes.

35 8. A process according to claim 7 wherein weight ratio of the essential oil-rich hop extract: the hop

extract residue is 1:1 to 1:3.

Sub C2  
9. A process for production of a highly aromatic wort comprising the steps of:

5 (1) adding a product according to claim 5 to a wort during the step of the wort boiling; and

(2) further boiling the wort containing the above-mentioned product for at least 4 minutes.

10 10. A process according to claim 9, wherein weight ratio of the essential oil-rich hop extract: the hop extract residue is 1:1 to 1:3.

Sub C3  
11. A process for production of a highly aromatic wort comprising the steps of:

15 (1) adding a product according to claim 5 to a wort after the wort boiling during the whirlpool rest step; and

(2) maintaining the wort containing the product at a temperature of at least 95°C for at least 10 minutes.

20 12. A process according to claim 11, wherein weight ratio of the essential oil-rich hop extract: the hop extract residue is 1:1 to 1:3.

13. A process for production of a highly aromatic wort comprising the steps of:

25 (1) extracting hops with a supercritical or subcritical carbon dioxide solvent to obtain a carbon dioxide extract and a hop extract residue;

(2) separating a hop extract<sup>res</sup> from the carbon dioxide extract;

30 (3) mixing the <sup>CO<sub>2</sub></sup> hop extract and the hop extract residue to obtain a product;

(4) adding the product from step (3) to a wort; and

35 (5) maintaining the wort containing the product at a temperature of at least 95°C for at least 10 minutes.

14. A processes according to claim 13, wherein weight ratio of the hop extract: the hop extract residue

is 1:2 to 1:5.

Sub C4  
15. A process for production of a highly aromatic wort comprising the steps of:

5 (1) extracting hops with a supercritical or subcritical carbon dioxide solvent to obtain a carbon dioxide extract and a hop extract residue;

(2) separating a hop extract from the carbon dioxide extract;

10 (3) mixing the hop extract and the hop extract residue to obtain a product;

(4) adding the product from step (3) to a wort during the wort boiling; and

(5) further boiling the wort containing the product for at least 4 minutes.

15 16. A process according to claim 15, wherein weight ratio of the hop extract: the hop extract residue is 1:2 to 1:5.

Sub C5  
17. A process for production of a highly aromatic wort comprising the steps of:

20 (1) extracting hops with a supercritical or subcritical carbon dioxide extract to obtain a carbon dioxide extract and a hop extract residue;

(2) separating a hop extract from the carbon dioxide extract;

25 (3) mixing the hop extract and the hop extract residue to obtain a product;

(4) adding the mixture from step (3) to a wort after the wort boiling during the whirlpool rest; and

30 (5) maintaining the wort containing the product at a temperature of at least 95°C for at least 10 minutes.

18. A process according to claim 17, wherein weight ratio of the hop extract: hop extract residue is 1:2 to 1:5.

35 19. A process for production of highly aromatic beer characterized by using a wort obtainable according to claim 1.

20. A process for production of highly aromatic beer characterized by using a wort obtainable according to claim 8.

5 21. A process for production of highly aromatic beer characterized by using a wort obtainable according to claim 9.

22. A process for production of highly aromatic beer characterized by using a wort obtainable according to claim 10.

10 23. A process for production of highly aromatic beer characterized by using a wort obtainable according to claim 12.

15 24. A process for production of highly aromatic beer characterized by using a wort obtainable according to claim 13.

25. A process for production of highly aromatic beer characterized by using a wort obtainable according to claim 14.

20 26. A process for production of highly aromatic beer characterized by using a wort obtainable according to claim 16.

27. A process for production of highly aromatic beer characterized by using a wort obtainable according to claim 17.

25 28. A process for production of highly aromatic beer characterized by using a wort obtainable according to claim 18.

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